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**Environmental systems and societies**  
**Standard level**  
**Paper 1 – resource booklet**

Friday 30 October 2020 (afternoon)

1 hour

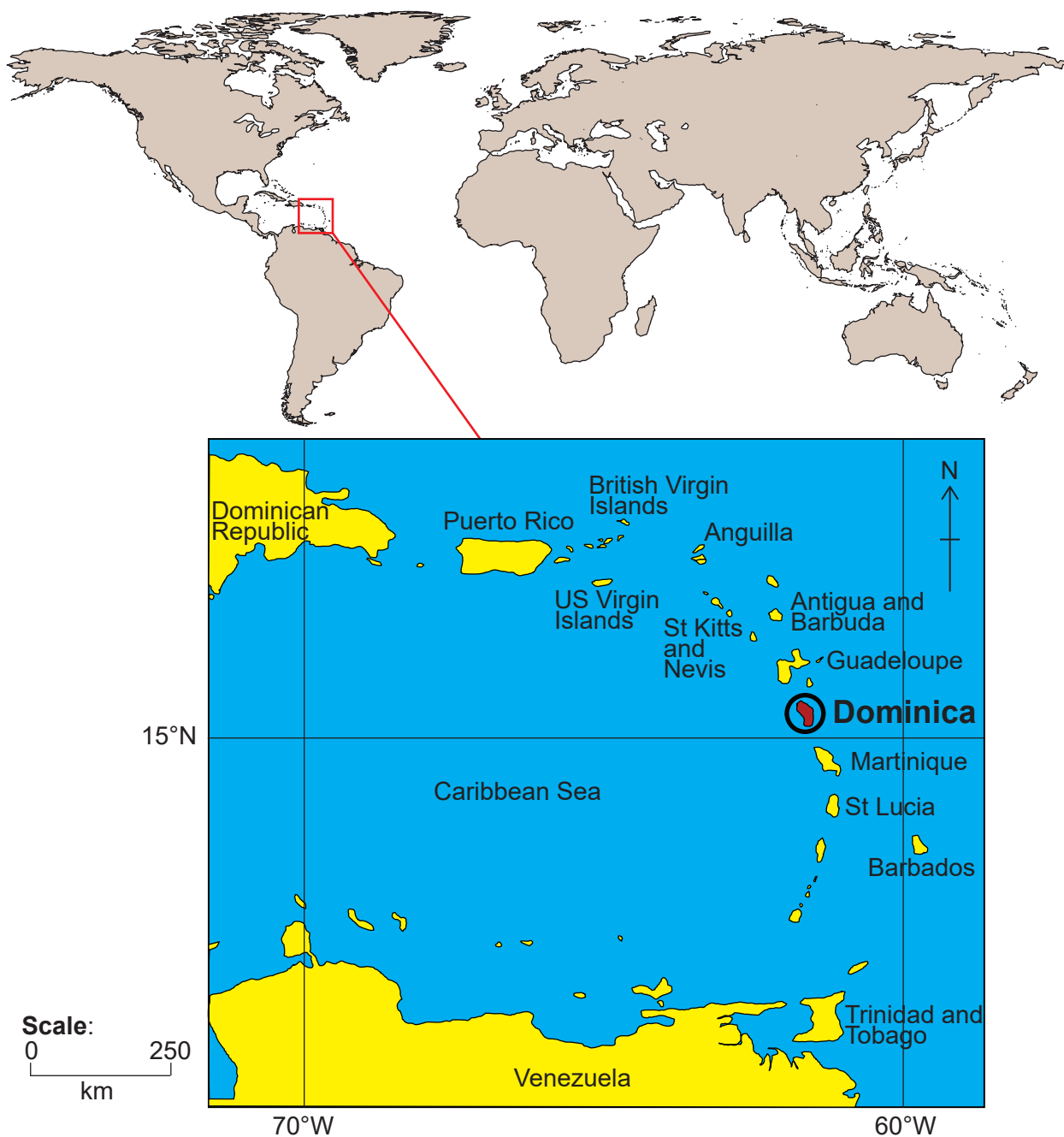
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**Instructions to candidates**

- Do not open this booklet until instructed to do so.
- This booklet contains all the resources to answer paper 1.

Blank page

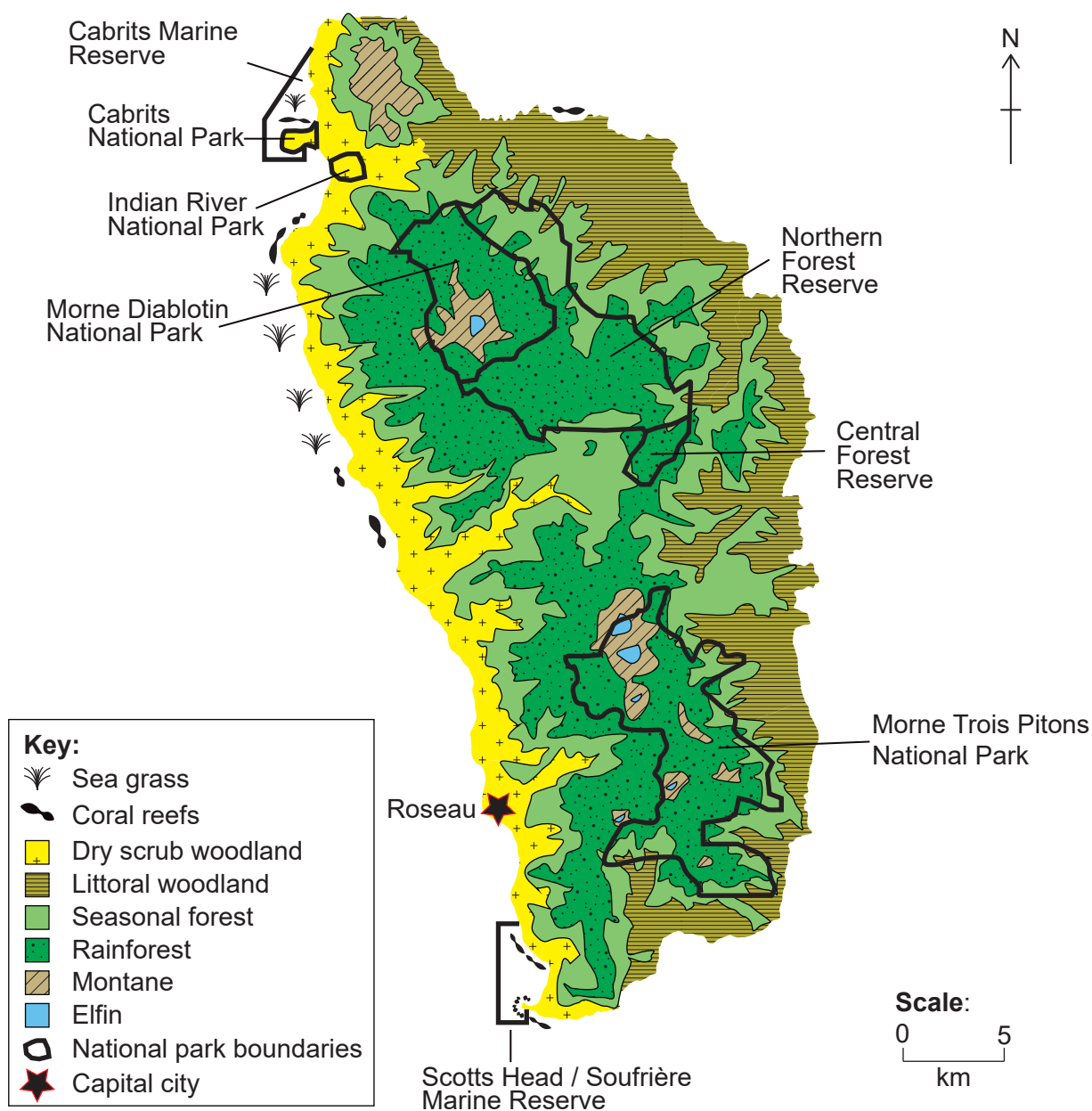
**Figure 1(a): Location of Dominica**



**Figure 1(b): Fact file on Dominica**

- Volcanic island in the Caribbean Sea.
- Population of 72 000.
- Self-sufficient in fruit and vegetables.
- 40% of the population works in agriculture.
- 60% of the island is covered in primary rainforest.
- Diversifying into ecotourism, particularly coral reef diving and whale watching.

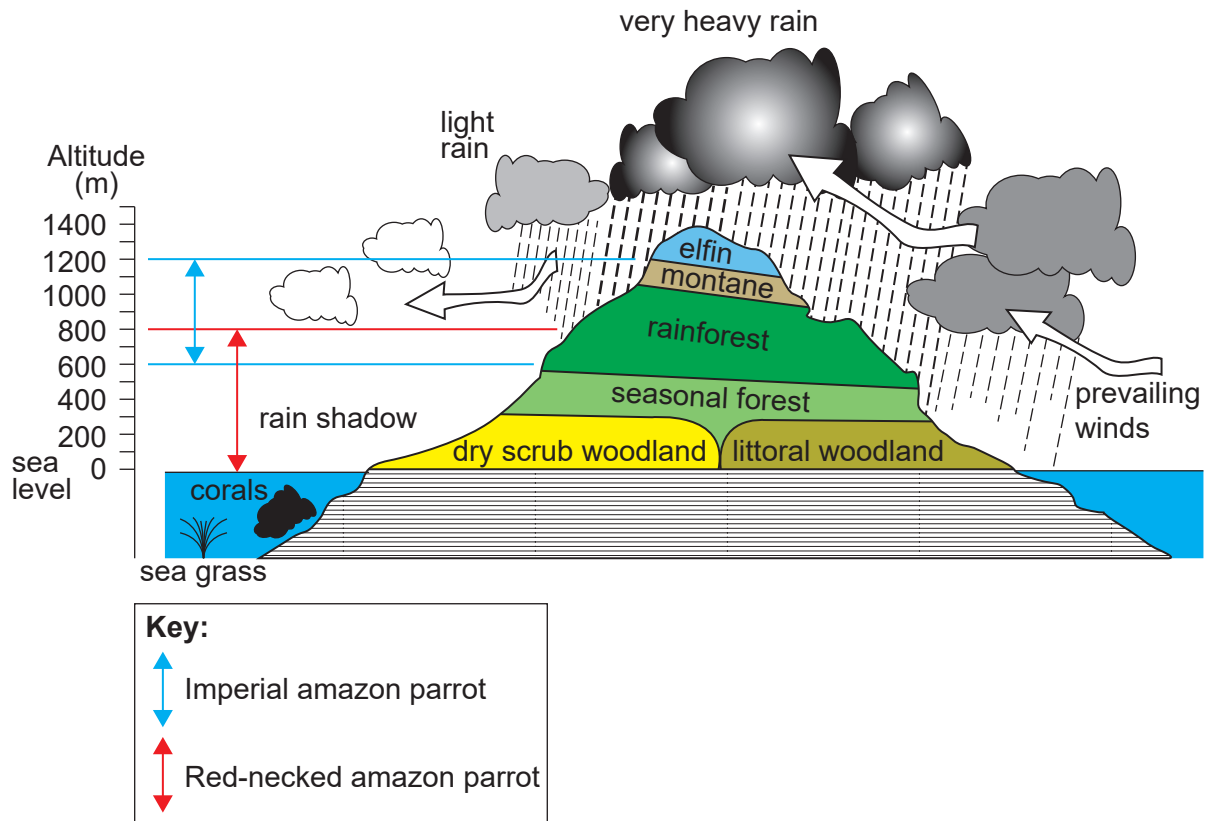
**Figure 1(c): Ecosystems of Dominica**



(Figure 1(c) continues on the following page)

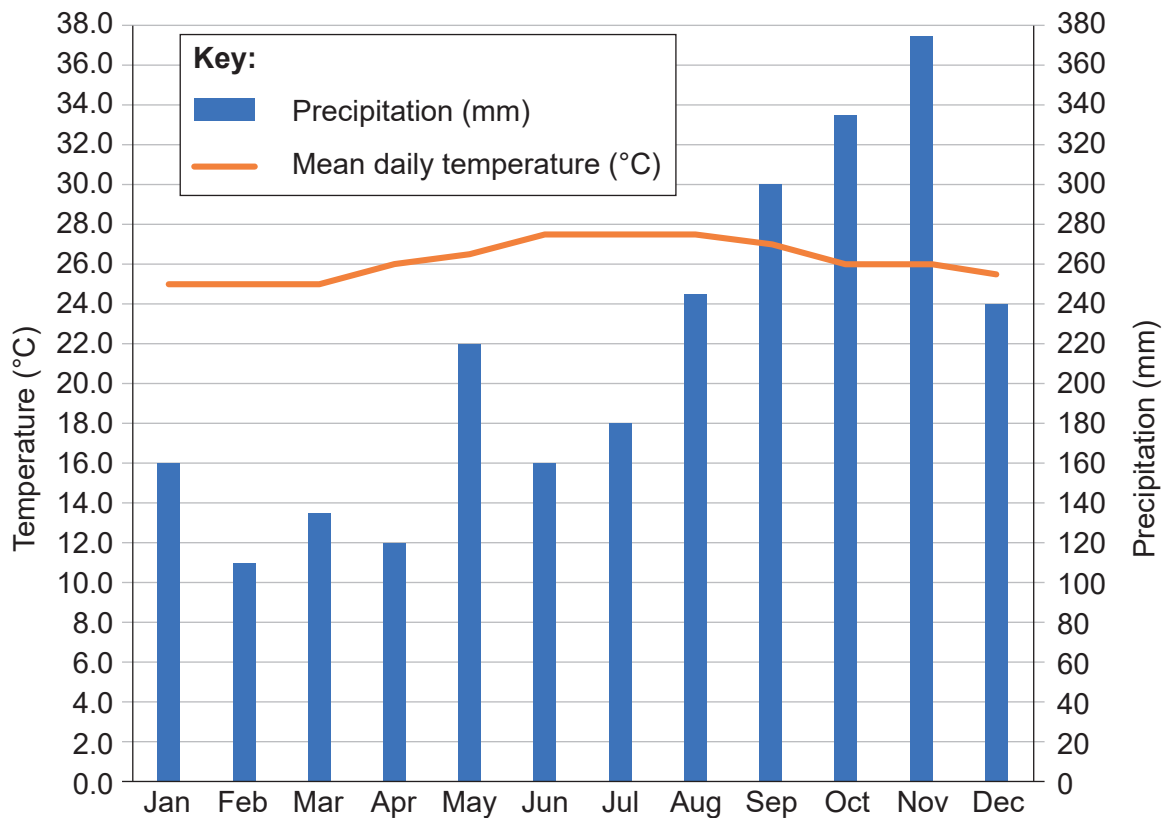
(Figure 1(c) continued)  
West

East



[Source: *The Dominica Story: A History of the Island*. Lennox Honeychurch ©1995 Macmillan Education. Reproduced with permission of the Licensor through PLSclear.]

Figure 1(d): Climate graph for Roseau, Dominica



Turn over

**Figure 2(a): Fact file about the red-necked and imperial amazon parrots**



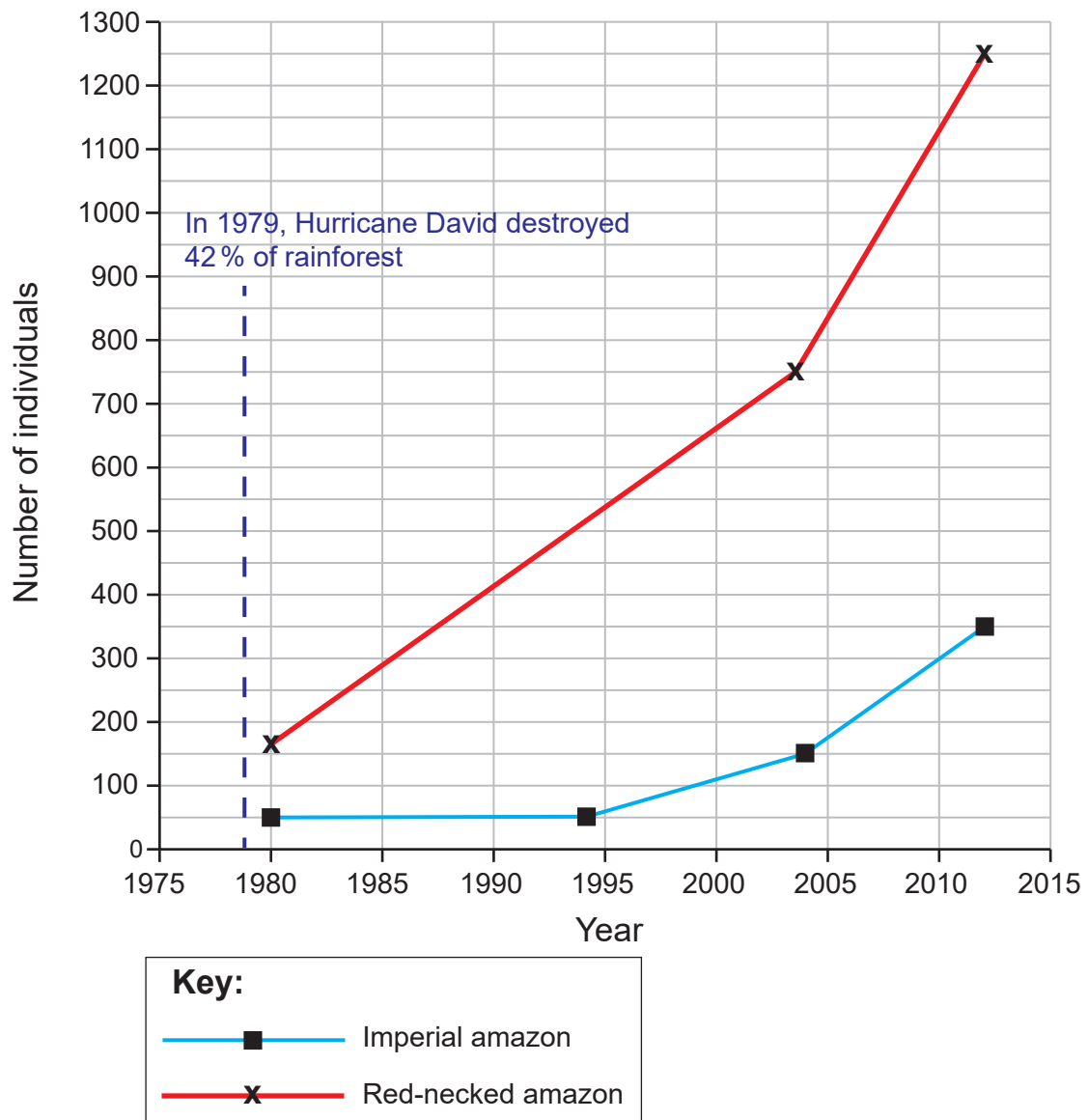
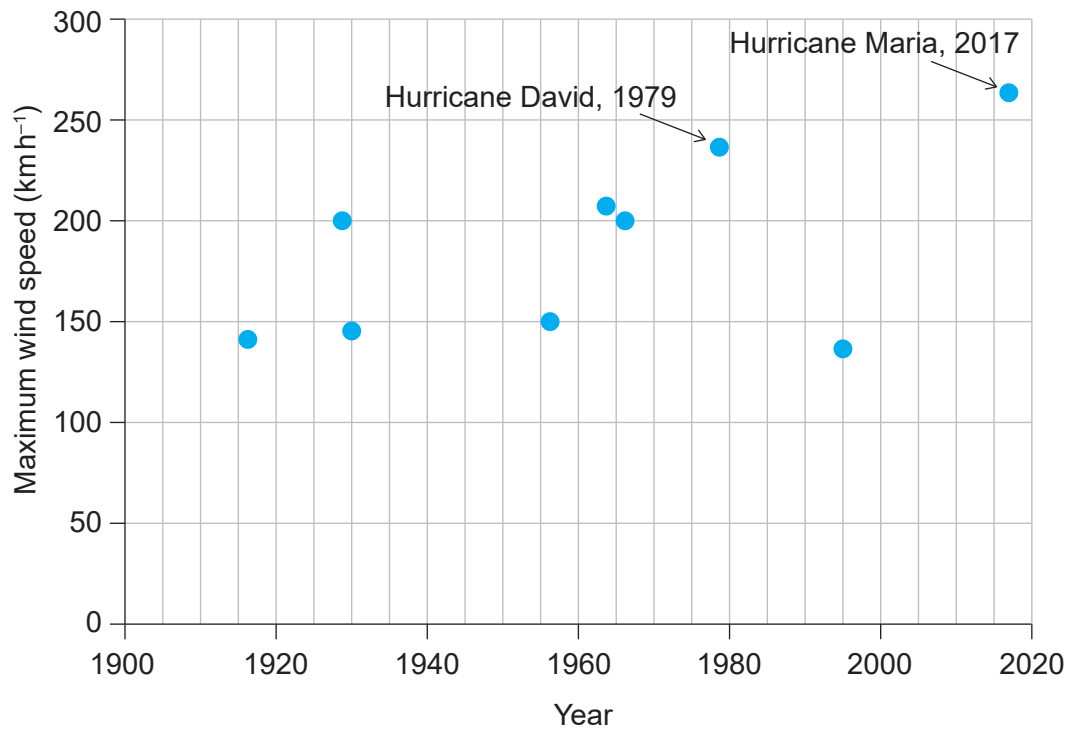
<p><b>Red-necked amazon (<i>Amazona arausiaca</i>)</b></p>  <ul style="list-style-type: none"> <li>• Social, flies in groups of 30+ birds during the non-mating season.</li> <li>• Eats forest fruits and nuts; also feeds in banana and citrus plantations.</li> <li>• Lives between 0 m and 800 m in elevation.</li> <li>• Nests in holes in trees.</li> <li>• Endemic to Dominica.</li> <li>• IUCN Red List status: Vulnerable.</li> </ul>	<p><b>Imperial amazon (<i>Amazona imperialis</i>), the national bird of Dominica</b></p>  <ul style="list-style-type: none"> <li>• Shy, lives singly or in pairs.</li> <li>• Mates for life and may die if it loses its partner.</li> <li>• Territorial, guards nesting sites all year round.</li> <li>• Eats forest fruits and nuts.</li> <li>• Lives in dense forest.</li> <li>• Lives between 600 m and 1300 m in elevation.</li> <li>• Nests in holes in trees.</li> <li>• Endemic to Dominica.</li> <li>• IUCN Red List status: Endangered.</li> </ul>
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Figure 2(b): Changes in the numbers of individual imperial and red-necked amazon parrots

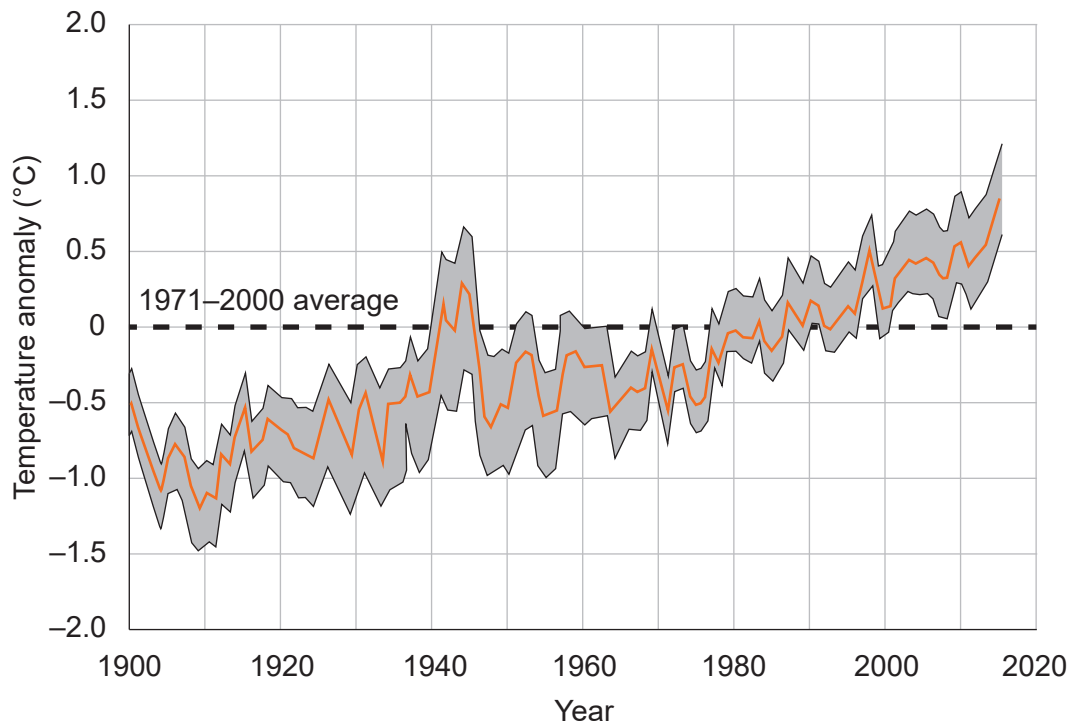




**Figure 3(a): Hurricane history of Dominica since 1900**



**Figure 3(b): Average global sea surface temperature, 1900–2015**



**Key:**

- Average global sea surface temperature ( $^{\circ}\text{C}$ )
- Uncertainty in sea surface temperature readings ( $^{\circ}\text{C}$ )

**Figure 3(c): Impacts of Hurricane Maria**

- 100 % of food crops were destroyed.
- 90 % of housing was damaged.
- Almost 10 000 landslides occurred.
- Extreme damage to tropical rainforest: all leaves removed from trees and large numbers of trees knocked down.
- Major damage to coral reef systems caused by waves and soil erosion from the island.
- Contamination of freshwater by oil spills and chemicals.

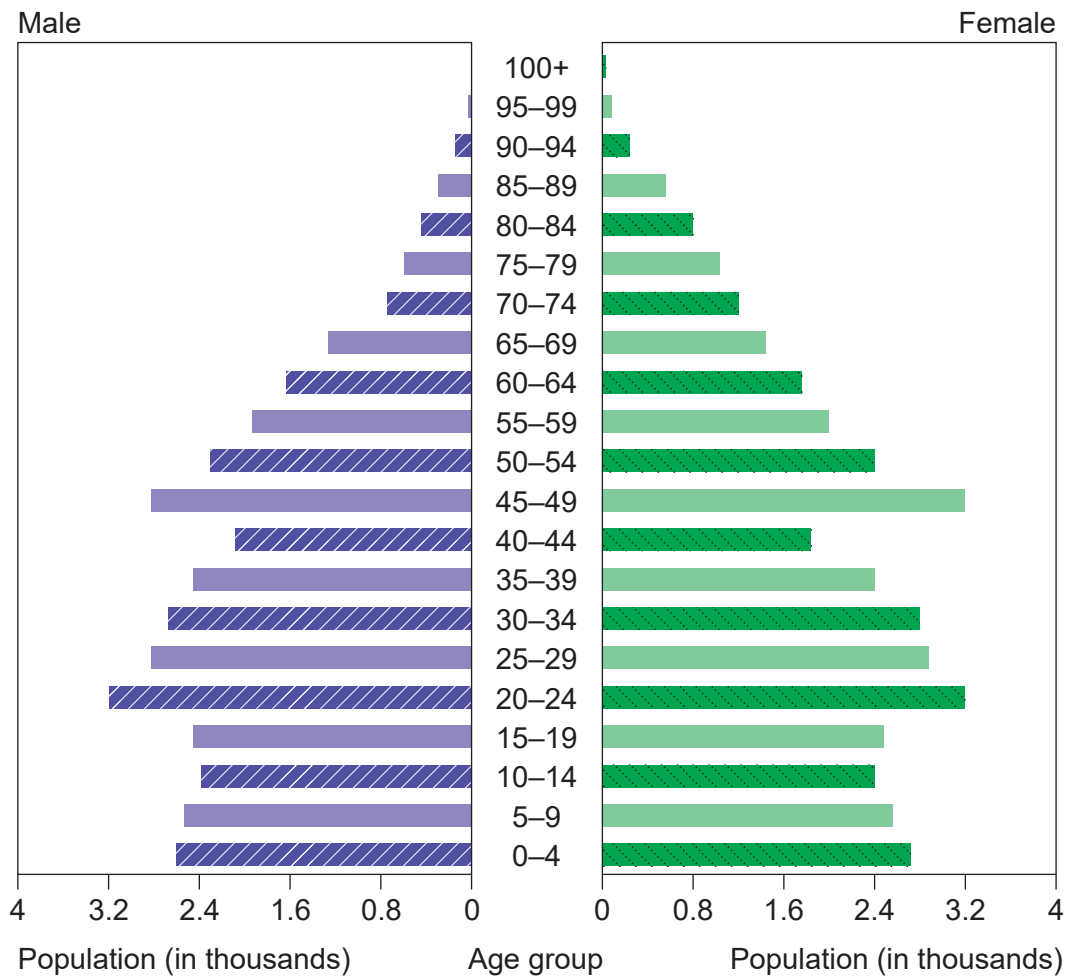


Damage caused by Hurricane Maria

**Figure 3(d): Landslide caused by heavy rains after a hurricane**



**Figure 4(a): Population pyramid for Dominica, 2018**



**Figure 4(b): Population statistics for Dominica, 2017**

Birth rate	15.1 per 1000
Death rate	7.9 per 1000
Net migration rate	–5.4 per 1000
Median age	33.5 years
Urban population	70.5 %
Total fertility rate	2.03 children per woman

**Figure 5: “Building back better”**



Dominica is focusing on a “Building back better” programme of recovery after Hurricane Maria to:

- become the world’s first climate-resilient nation
  - conduct disaster risk assessment before reconstruction
  - build hurricane-proof buildings
  - build using local skills and resources
  - focus on community participation in reconstruction
  - plant fast-growing crops, such as lettuce and Chinese cabbage
  - focus on root crops, such as sweet potatoes and ginger
  - plant heat-tolerant varieties of foods
  - keep farm animals in air-conditioned buildings.
-

## References:

**Figure 1(a)** © International Baccalaureate Organization 2020.

**Figure 1(c)** [map] © International Baccalaureate Organization 2020.

[forest types diagram] *The Dominica Story: A History of the Island*. Lennox Honeychurch ©1995 Macmillan Education. Reproduced with permission of the Licensor through PLSclear.

**Figure 1(d)** Adapted from World Weather & Climate Information, Climate and Average Monthly Weather in Roseau, Dominica. Available at <https://weather-and-climate.com/average-monthly-Rainfall-Temperature-Sunshine,roseau,Dominica>.

**Figure 2(a)** © International Baccalaureate Organization 2020.

**Figure 2(b)** Paul R. Reillo, Ph.D., President, Rare Species Conservatory Foundation, Director, Tropical Conservation Institute, Research Professor, Institute of the Environment, Florida International University.

Data from World Parrot Trust, 2019. <https://www.parrots.org/projects/red-necked-amazon>.

ACTP. *ACTP responds to the commentary concerning conservation measures required for the endangered Amazon parrots of the Commonwealth of Dominica*. 2018 Available at: <https://www.act-parrots.org/wp-content/uploads/2018/04/Dominica-Statement.pdf>.

**Figure 3(a)** Adapted from Dominica's history with tropical storms. Available at: <http://www.hurricanecity.com/city/dominica.htm>.

**Figure 3(b)** NOAA.

**Figure 3(c)** [text] Adapted from ACAPS, 2018. Dominica: The impact of Hurricane Maria. Available at: [https://www.acaps.org/sites/acaps/files/products/files/20180131\\_acaps\\_disaster\\_profile\\_dominica\\_v2.pdf](https://www.acaps.org/sites/acaps/files/products/files/20180131_acaps_disaster_profile_dominica_v2.pdf).

[left image] Photo credit: Marica Honeychurch.

[right image] Photo courtesy of CARICOM, September 21, 2017, <https://caricom.org/carpha-ready-to-assist-dominica/>.

**Figure 3(d)** Photo courtesy of Jodie Dangleben.

**Figure 4(a)** CIA, 2018. *The World Factbook: Dominica*. Available at: <https://www.cia.gov/library/publications/the-world-factbook/geos/do.html>.

**Figure 5** [image] Gemma Handy.

[text] United Nations Development Programme - UNDP Barbados & the Eastern Caribbean.